

before the current coordination proceedings are completed and the final results known and made public.

The establishment of a single MSS licensee in the upper portion of the conventional MSS L-Band was driven by certain unique circumstances. Even in its decision to establish what is now AMSC, the Commission explicitly recognized that multiple MSS systems could be authorized if additional spectrum was made available.<sup>24</sup> With the allocation of the 33 MHz of RDSS spectrum to MSS, the Commission now has the opportunity to establish competition in the domestic MSS market. In particular, the Commission has the opportunity to license five additional MSS systems in competition to AMSC. This will provide for a total of six competing MSS systems serving the United States in the near-term. Until these competing systems are established, AMSC should be precluded from enhancing its current status as sole domestic MSS licensee by adding other frequency bands to its system.

IV. The Commission's Proposed Frequency Assignment Plan, With Some Modifications, May Be An Acceptable Basis For Licensing 1.6/2.4 GHz MSS LEO Systems

From the outset, Constellation has developed its system and business plan in anticipation that several LEO systems would be operating in the 1610-1626.5 MHz

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<sup>24</sup> See Second Report and Order, in Gen Docket No. 84-1234, 2 FCC Rcd 485 (1987) at n. 16.

and 2483.5-2500 MHz bands.<sup>25</sup> Constellation therefore initially designed its system to utilize only a small portion of the 1610-1626.5 MHz band not utilized by other radio services in order to allow other systems the opportunity to access the remaining portion of the band. At the same time Constellation proposed to use the entire S-band downlink band on a spread spectrum, interference sharing basis with other LEO systems so that its system would comply with the power flux density levels required to protect terrestrial microwave stations. As described in Appendix B to these comments, Constellation could still utilize this approach with a much higher capacity satellite than originally proposed in 1991.

The simplest and fairest means of resolving this proceeding would be to assign each of the five LEO systems an equal portion of the L-band and S-band resource, and to require each of them to design their systems to operate within such assignments.<sup>26</sup> If each licensee's assignment was divided among the upper part of L-band not shared with other services and the lower part of L-band that is shared, each licensee would be provided with an equal footing to establish its business without the Commission having to rank systems or provide preferential access to the band by one of the pending applicants. Moreover, each system operator could implement its own vision of the market without detailed regulatory intervention.

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<sup>25</sup> See Constellation's 1991 Petition for Rulemaking, supra note 1.

<sup>26</sup> Such an approach could also include provisions for the reassignment of spectrum from initial licensees who failed to meet implementation milestones to those who did meet them.

At present, there are five applications pending to operate LEO systems in the 1610-1626.5/2483.5-2500 MHz bands. Each of these applicants requested assignment of some or all of the relevant parts of the band. If any part of these bands are assigned exclusively to any one applicant, it will result in the denial of another applicant's application unless all the other applicants amended their application to conform to the exclusive assignment. In Ashbacker Radio v. FCC, 326 U.S. 327 (1945), two applications were filed with the Commission, one for a new broadcast station and one for a change in frequency. For reasons of electrical interference both could not be granted. The Commission granted one application and set the other for hearing. The Supreme Court reversed the Commission's decision, finding "if the grant of one application effectively precludes the other, the statutory right to a hearing which Congress has accorded before denial of their applications becomes an empty thing." 326 U.S. at 330. In this proceeding Constellation requested assignment of the 1624.5-1626.5 MHz band. To the extent that the Commission grants some other applicant the exclusive use of this band, it will result in the denial of Constellation's application. Under these circumstances, the Commission must provide Constellation a hearing or utilize some alternative license selection mechanism.

Constellation believes that the above scenario would be destructive to all the pending applicant's business plans and the United States ability to take a leading role in the development of a global mobile satellite system. It therefore is committed to a mutual resolution of all outstanding spectrum sharing issues by the

pending qualified applicants. In this regard, Constellation believes that the Commission's L-Band sharing proposal is a suitable framework for resolving mutual exclusivity. Constellation therefore, will continue to participate in settlement discussions among the applicants and if an agreement can be reached is prepared to amend its application to eliminate mutual exclusivity. The following is a review of Constellation's position on how to resolve the intra-service sharing issue.

A. All Parts Of The 1610-1626.5 MHz Band Can Not Be Treated Equal

In its application, Constellation specifically requested assignment of the 1624.5-1626.5 MHz band because of the likely operating constraints resulting from the sharing arrangements in the lower part of the band.<sup>27</sup> As the Commission is well aware, the upper part of the RDSS/MSS L-band at 1616-1626.5 MHz is much more desirable and usable than the lower 6 MHz. In the lower part of the band, operation of user terminals is prohibited within the radio protection zones afforded radio astronomy sites at 1610.6-1613.8 MHz under Section 25.213(a)(1) of the proposed rules, and additional constraints on user terminals may be imposed as a result of the international coordination process in the 1610-1616 MHz part of the band to protect Glonass receivers.<sup>28</sup> On the other hand, no basic limitations are

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<sup>27</sup> Constellation application, *supra* note 1, at 1 and Appendix A, Tables A-4 and Figure A-7.

<sup>28</sup> Glonass is a Russian aeronautical radionavigation satellite system operating under the provisions of RR 732 as a part of the Global Navigation Satellite System to supplement the Global Positioning System ("GPS").

foreseen on the operations of mobile earth terminals in the upper 10.5 MHz part of the band between 1616 MHz and 1626.5 MHz.<sup>29</sup>

As a result of these inter-service sharing constraints, it is clear that there is a substantial difference between the upper and lower parts of the 1610-1626.5 MHz band. The Commission can not consider frequencies in the different parts of the band to be functionally equivalent or fungible for frequency assignment purposes.<sup>30</sup> Any frequency assignment scheme that gives one licensee more of the preferable spectrum in the upper part of 1610-1626.5 MHz band than other licensees is prima facie discriminatory.

In order to avoid this problem, the Commission could create fungible L-Band assignments by adopting a rule that assigns each licensee an equal amount of spectrum in both the desirable upper part of the band and the undesirable lower part of the band, and then require the applicants to redesign their systems to operate under these constraints. Such an approach would treat each applicant the same and would avoid preferential treatment of any particular applicant.

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<sup>29</sup> The use of terrestrial fixed stations under RR 730 may impose limitations in certain foreign countries, but these should be no worse than those applied to conventional MSS terminals currently operating at frequencies immediately above 1626.5 MHz or in the 1610-1616 MHz band.

<sup>30</sup> This would be akin to viewing a Class A, Class B and Class C FM stations as equals.

B. It Is Manifestly Unfair To Provide One Applicant Exclusive Use Of The Preferred Part Of The Band To The Detriment Of Other Applicants

The Commission's proposed L-band frequency assignment plan, no matter how it is couched, is a proposal to assign one of the pending applicants, i.e., Motorola Satellite Communications, Inc. ("Motorola"), the top and most desirable 5.15 MHz, and to require the four LEO CDMA systems to share the lower 11.35 MHz. This plan clearly puts Motorola in a preferential competitive position. This is for several reasons. First, Motorola will not have to coordinate its use of the band with any other services within the United States. Nor will it have to coordinate with any other 1.6/2.4 GHz MSS operators. On the other hand, the four CDMA systems will have to coordinate 3.2 MHz of their proposed 11.35 MHz with radio astronomy sites. As agreed during the NRM and proposed by the Commission this means service will be impaired in those 3.2 MHz band at agreed to protection zones near radio astronomy sites. Second, the 6 MHz from 1610 to 1616 MHz may be encumbered by Glonass sharing conditions. How this inhibits operations remains unclear but it is a clear risk that the four CDMA LEO systems must bear. Motorola does not have to contend with either of these problems. Thus, while Motorola has access to 5.15 MHz of unencumbered spectrum, the four CDMA LEO applicants must share a mere 5.35 MHz of unencumbered spectrum. Third, Motorola does not have to contend with intra-service sharing issues. While CDMA applicants must come to mutual agreement on how they will share their

assigned spectrum, Motorola does not need to coordinate with any other satellite system operator. Given this situation, there can be no doubt that the Commission's proposed frequency assignment plan provides Motorola preferential treatment.

C. The Commission's L-Band Assignment Proposal Can Resolve The Issue Of Mutual Exclusivity With Clarification And Modifications

In its 1991 application, Constellation requested the assignment of 2 MHz of spectrum at 1624.5-1626.5 MHz for its system based on a FDMA system design.<sup>31</sup> Since then, in order to help solve the interference sharing problems inherent in this proceeding, Constellation indicated its willingness to employ CDMA for its L-band transmissions, and developed a baseline satellite design that can provide 1,000 voice channels in a bandwidth of 2.5 MHz in the absence of inter-system interference.<sup>32</sup> However, these design changes were not without penalty. In order for Constellation to operate in the proposed interference sharing mode, Constellation will have to design and launch satellites that are substantially larger in size, weight and cost in order to achieve the same channel capacity. The details of this analysis are provided in Appendix B to these comments.

Nevertheless, Constellation has continually sought to reach an agreement with the other applicants that would allow the Commission to grant all of the

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<sup>31</sup> See supra n. 27.

<sup>32</sup> See Appendix B to these Comments. The spectral efficiency of this satellite design is comparable to the spectral efficiencies being claimed by other applicants.

pending LEO applications. To this end, Constellation has indicated its willingness to operate its system using CDMA techniques. As of the date of these comments, however, there is no agreement among the LEO applicant on how to share the available spectrum. Constellation believes that the Commission's sharing proposal can be the basis for an overall settlement of this proceeding if the following modifications are made:

1. A Contingency Plan Must Be Agreed To  
If The 1610-1616 MHz Band Is Impaired  
As A Result Of Glonass Operations

Glonass may impair the ability of Constellation and other licensees to use the 1610-1616 MHz band. This impairment may result from the actual operation of the Glonass system or regulatory restrictions that are designed to protect the integrity of the Glonass system. At present, there is no international agreement on the protections that are to be provided to Glonass<sup>33</sup> or how and where it will operate in this country as part of the Global Navigation Satellite System ("GNSS") to complement GPS for aeronautical navigation. Until such an agreement is reached, there remains significant risk that some or all of the 1610 to 1616 MHz band will be unavailable to pending LEO applicants. Without a contingency plan, the burden of this risk must be shouldered by the four CDMA applicants. This is just not fair. All of the pending qualified applicants should share the burden

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<sup>33</sup> The 1992 WARC specified in RR731F a -15 dBW/4 KHz limit on the EIRP density transmitted by MSS earth stations on frequencies used by Glonass. However, during the NRM, the aviation community asserted that this level of interference protection was inadequate.



presented by Glonass equitably. In order to meet this goal, Constellation supports the following approach:

- All applicants should work with the U.S. government to move Glonass operations below 1608 MHz.
- If at the time the Commission is prepared to issue construction permits Glonass issues are not resolved, then a "contingency plan" would become effective.
- The Glonass issue is considered resolved if the use of the 1610-1616 MHz band is for all practical purposes identical to that for the 1616-1626.5 MHz band except for the protections provided the radio astronomy service.
- Under the contingency plan each licensee's relative share of the assigned spectrum would be reduced proportionately. For instance, if the entire 1610-1616 MHz band was unavailable the FDMA/TDMA band would be reduced 36.4% ( $6/16.5 = 36.4\%$  of the original assignment) or from 5.15 MHz to 3.28 MHz. Likewise, the CDMA band would be reduced from 11.35 MHz to 7.22 MHz.
- Each licensee would be authorized to build its system in accordance with the agreed upon sharing plan for the entire 16.5 MHz of L-band spectrum. When the Glonass issue is resolved, the licensee could immediately utilize all its assigned spectrum.

Constellation believes that the approach described can ensure that all applicants are treated fairly under the Commission's proposed sharing plan.

2. An Intra-Service Coordination Mechanism Must Be Established To Allow Different System Architectures To Be Implemented in an Equitable Fashion

The Commission in its proposed rules did not specify any process for coordinating CDMA systems with other CDMA systems or CDMA systems with FDMA/TDMA systems. Constellation believes such a system must be put into place now if the licensees in these bands are going to be able to successfully implement these systems. If interference sharing is utilized in the CDMA portion of L-band, Constellation proposes that the Commission provide guidelines for the coordination of the various systems sharing the band. Constellation was one of the parties who subscribed to the original full band interference sharing proposal at the beginning of the NRM proceedings. At that time Constellation believed that full band interference sharing, if adopted by all applicants, was the best compromise to resolve the question of mutual exclusivity and allow the prompt authorization of service. However, as indicated in the Joint Proposal at the beginning of the NRM, a coordination procedure is needed to implement interference sharing. Part of this coordination would include verification of the "impairment" and "enhancement" factors employed in the theoretical capacity calculations in the NRM Report, as well as verification of the expected statistical distributions of these factors as they determine expected interference levels and system capacities. Moreover, such a coordination mechanism must allow full flexibility in utilizing cross polarization and frequency planning techniques to control inter-system interference in order to

maximize system capacity and minimize system costs under the interference sharing scheme. Constellation believes that the coordination procedure embodied in the initial proposal of the CDMA applicants to the NRM remains a practical means of describing the necessary coordination elements.<sup>34</sup>

Finally, there needs to be a mechanism to minimize any interference disputes between CDMA operators and the TDMA/FDMA operator. Under the Commission's sharing proposal, the TDMA/FDMA operator is assigned a disproportionate amount of the available spectrum. To the extent that there needs to be a guard band between the CDMA and TDMA/FDMA systems, Constellation believes that such guard band should not impair the spectrum available to the CDMM systems. Thus, any guard band would have to be placed in the 5.15 MHz spectrum identified for the TDMA/FDMA assignment. To do otherwise, would merely enhance an already unfair situation.

3. The CDMA Applicants Must Be Allowed To Share  
The Entire 2483.5-2500 MHz Band

The Commission is proposing "to authorize CDMA operators to share the same amount of downlink spectrum as uplink spectrum."<sup>35</sup> In order for the CDMA systems to effectively operate at minimum cost and maximum capacity they must be given access to the entire allocated downlink band at 2483.5-2500 MHz.

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<sup>34</sup> See Appendix D to these Comments at Proposed Section 25.141(e).

<sup>35</sup> Notice, at para. 37 and n. 69.

Specifically, the CDMA system licensees must have access to the entire band in order to minimize the cost of the satellites.

As illustrated in Appendix B to these Comments, the capacity available to any single system in any segment of the S-Band downlink decreases as the number of systems operating in the band increases. Overall system capacity is retained by operating over a wider bandwidth. However, this requires the satellite to generate and transmit more total power, which entails a heavier and more costly satellite. Coordination of the operational frequency plans among the CDMA LEO system to minimize the number of satellites transmitting in any segment of the 2483.5-2500 MHz band can substantially reduce the cost of individual satellites. Given that 16.5 MHz is already allocated for S-Band downlinks, Constellation believes that it would be a mistake for the Commission to limit the CDMA system to only 11.35 MHz of S-Band spectrum.

Constellation believes that these three modifications described above provide a basis to improve the Commission's sharing proposal and enable a more equitable assignment of spectrum to the pending applicants.

## V. Alternative Licensing Methods

As the Commission recognizes, mutual exclusivity exists among the five pending LEO applicants absent a settlement agreement. As discussed above, the different sharing constraints in the different parts of the 1610-1626.5 MHz L-Band do not allow the Commission to treat all parts of the band as fungible, and the Commission cannot deny Constellation's application for the assignment of the 1624.5-1626.5 MHz band without a hearing.

Constellation will continue to work with the other applicants in order to reach an agreement on spectrum sharing. However, if a proposed sharing scheme is too onerous and blatantly favors one applicant over the others, Constellation might be better off under one of the alternative licensing schemes identified in the Notice. This is particularly true if the result is that the preferential treatment allows Motorola to promptly implement its system in the band exclusively assigned to it while the other LEO system operators become mired in coordination among themselves and with other users of the band.

Constellation believes there are several basic principles that should be employed in developing any such administrative selection mechanism. First, there should be at least three licensees in this band and all qualified applicants should be afforded an equal opportunity to obtain any assignment in the band. To do

otherwise, would result in the creation of a duopoly for LEO MSS service.<sup>36</sup> Such a closed market structure would be completely contrary to the Commission's satellite policies which have consistently promoted competition. A recent GAO Report analyzing competition in the cellular market concluded that "generally accepted economic principles imply that the fewer the number of producers in a market the less likely that they will set competitive prices. Since a duopoly has only two producers, it is likely that these producers can find a way to act non-competitively than would be the case if there were, for example, five or six producers."<sup>37</sup> In this proceeding, there is no reason to limit the number of service providers to two. This is especially true when it is generally assumed that up to five systems could be accommodated. Second, the selection mechanism should award band segments based on technical considerations that result in efficient use of the band so that no portions are wasted. In particular, the unit of bandwidth should bear some relationship to the bandwidth needed for an operational system.<sup>38</sup> Third, the Commission must clearly state the precise scope of any technical and related operating conditions governing each assignment given the non-fungibility of different parts of the band. Fourth, the selection mechanism should not create any

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<sup>36</sup> See generally, Concerns About Competition in the Cellular Telephone Service Industry, United States General Accounting Office, (July 1992) ("GAO Report") for a review of the competitive implications of a duopoly.

<sup>37</sup> Id. at 20.

<sup>38</sup> For example, for CDMA systems, the bandwidth may be better related to a factor of the form  $75 * N * 2^k$  rather than a uniform fraction of the available band (any overflow can be assigned separately). In this example, the  $75 * N$  factor relates to standard baseband data transmission rates and the  $2^k$  factor relates to the length of the codes used for spreading.

impediments to the establishment of economically viable systems. Selectees should be given maximum flexibility to use their assignments in the manner that best guarantees their financial success. Fifth, any selection mechanism implemented in the United States is likely to be emulated in other countries. The Commission should not design a selection mechanism that can be used to thwart the completion of international coordination of LEO MSS systems serving United States territory, nor encourage other countries to impose financial or other burdens on United States licensees seeking to extend the service of their LEO MSS systems to other countries. If the United States imposes financial impediments on licensees, it could have a domino effect around the world that could destroy the viability of this exciting new U.S. industry. Sixth, any selection mechanism should minimize administrative costs to the applicants and the Commission, minimize delay in the issuance of final licenses, and avoid uncertainty in the scope of construction, launch and operating authority granted to the licensee. Finally, the Commission must carefully integrate all of the administrative elements of its licensing rules and procedures should an alternative selection mechanism be selected. The overall process must integrate adoption of final rules (and any attendant judicial review), administrative selection mechanism, application amendments (either to conform to the final rules, pre- or post-selection) and international coordination results of international allocation decisions.

Adherence to these criteria should provide the Commission with significant guidance if it is necessary to utilize alternative selection mechanism. In the Notice,

the Commission identified three alternative mechanisms, comparative hearings, auctions or lotteries. Constellation does not believe that any of these options are desirable. However, if forced to select the least objectionable option, Constellation would choose lotteries. The following is a review of each of these alternatives.

A. Comparative Hearings

Comparative hearings are the traditional means of resolving mutual exclusivity among applicants. The Commission has wisely avoided the use of comparative hearings in the satellite services in the past, instead finding administrative means to grant licenses to all qualified applicants. Constellation agrees with the Commission's tentative decision that a comparative hearing is not an acceptable means of resolving any mutual exclusivity that may exist among the pending LEO applications.<sup>39</sup> A comparative hearing would be expensive, would require a long time to complete, and is unlikely to result in the identification of one or more distinctly preferable systems from the public interest standpoint. Each of the LEO applicants has its own approach to implementing LEO technology and creating a new business. It would be difficult for the Commission to specify comparative criteria that would reflect the unique capabilities of this technology. Use of traditional comparative criteria, on the other hand, is unlikely to result in a distinction among superior or preferred applicants compared to the others. While

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<sup>39</sup> Notice at para. 40.



international coordination is an important consideration in rejecting a comparative hearing as an administrative selection method, it is also a consideration in rejecting auctions as an administrative selection technique.

## B. Auctions

The Commission does not have the authority to issue licenses pursuant to an auction unless mutual exclusivity is present.<sup>40</sup> The Commission however, is obligated to use all tools at its disposal to eliminate mutual exclusivity.<sup>41</sup> Certainly, auctions should be viewed as a last resort for resolving this proceeding.

A review of how auctions would work in this proceeding reveals numerous problems and very limited public benefit. The single greatest problem presented by auctions is that it would represent the antithesis of U.S. policy regarding international assignment of satellite spectrum. The U.S. has taken great pains to ensure that no country or company has to pay for the spectral resource. This policy was grounded in the view that if one country had its hand out for a payment, many countries would have their hands out. This is precisely what has happened recently as a result of hoarding of orbital position by nations such as

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<sup>40</sup> See 47 U.S.C. § 309(j)(1).

<sup>41</sup> Representative Dingell in a letter to Chairman James Quello made it clear that the Commission was required by statute to try to find "engineering solutions, negotiation, threshold qualifications, and service regulations" as a means to eliminate mutual exclusivity. See Letter from Rep. John D. Dingell, Chairman, House Committee on Energy and Commerce, to Hon. James H. Quello, Chairman, Federal Communications Commission, November 15, 1993 at 2.

Tonga and Mauritius.<sup>42</sup> If the U.S. government were to auction the MSS/RDSS spectrum, it is safe to say that every country in the world would have its hand out before MSS service could be provided to a country's soil. This could have devastating impact on this burgeoning industry. In addition, by requiring potential MSS operators to pay large amounts of money simply to obtain a license to implement their satellite systems, the Commission would provide the incentive for U.S. companies to develop LEO technology through foreign based systems that did not have to spend significant amounts of capital for operating licenses. Under either scenario, auctioning would undermine long standing U.S. that radio frequency should not be treated as an economic asset.<sup>43</sup>

There are a number of other problems associated with auctions that are also common to lotteries. For instance, the proposed 2.065 MHz channel blocks is not consistent with any of the applicant's proposed channelization scheme and it will be essential to clearly define any technical or operating restrictions tied to each frequency block being auctioned.<sup>44</sup> Additionally, there does not seem a basis to promote small and minority businesses through this proceeding. This is one of the principal objectives of the Congressional legislation authorizing the Commission to

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<sup>42</sup> According to Fabio Leite, ITU engineer, the "vast majority - some 90% - of notifications filed with the ITU this year for satellite orbital positions are based on pure speculation". See Communications Daily, April 15, 1991 at 1.

<sup>43</sup> This has been a consistent U.S. position at International Telecommunication Union conferences during the last twenty-five years.

<sup>44</sup> Constellation also believes it would be unworkable to auction feeder link or inter-satellite link spectrum in conjunction with the auction of spectrum for service links.

use competitive bidding procedures. It does not seem likely that any of the pending MSS applicants could be designated as minority or small businesses.

Finally, auctions will not promote efficient use of the spectral resource and will likely eliminate any chance of CDMA sharing. The winner of the auction is not likely to make available any spectrum to a competitor. Given this result, if the Commission were forced to use auctions (or lotteries), it would be extremely important that at least three licensees be authorized if competition is going to develop in this service.

#### C. Lotteries

Constellation believes that a lottery is the least objectionable means of resolving mutual exclusivity because it does not present the international problems presented by auctions. If lotteries were used, the U.S. government would not be sanctioning the sale of the spectral resource. This would minimize the demands of foreign countries for payouts, discourage hoarding and warehousing of the spectral resource, and minimize the capital resources necessary to implement an MSS system. Moreover, lotteries could be implemented more quickly and with a lesser amount of administrative burden on the Commission and applicants. While not a fully satisfactory solution for many reasons identified above for auctions, lotteries on balance are preferable to auctions. This would especially be true if the Commission devised a lottery mechanism that would ensure a competitive market structure by

requiring that at least three licenses are issued for the MSS in the 1.6/2.4 GHz bands.

VI. The Commission's Proposed Qualifications Requirements Should Be Adopted With Minimal Clarification and Modifications

Constellation supports the basic qualification requirements to hold a 1.6/2.4 GHz MSS license proposed by the Commission.<sup>45</sup> However, as discussed below, Constellation is proposing several modifications in order to clarify their applicability to this new service.

A. Technical Qualifications

In paragraphs 19-25 of the Notice, the Commission addresses its proposals for general technical qualifications of applicants to hold a MSS license in the 1.6/2.4 GHz bands. Specifically, in Section 25.143(b)(2), the Commission is proposing four specific technical qualification requirements: (i) use of non-geostationary orbits, (ii) a minimum standard of global coverage, (iii) a minimum standard of United States coverage, and (iv) a non-interference showing. In principle, Constellation supports the adoption of all four of these technical qualification requirements. However, modifications are needed to the final rule texts to improve clarity and enforceability.

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<sup>45</sup> See Notice, paras. 18-28.

In response to paragraphs 23-24 of the Notice. Constellation supports the proposed global and United States minimum coverage requirements. However, Constellation believes that the rules should be stated only in terms of the geometric coverage requirements (i.e., minimum elevation angles). The references to "being capable of providing mobile satellite services" are ambiguous, may not be easily measurable, and are open to interpretation and dispute. Also, LEO satellites that do not employ inter-satellite links may not be "capable of providing mobile satellite services" to certain areas on the high seas that are far from major land masses where the gateway earth stations are located. For these reasons, Constellation proposes a specific rewording of these provisions in Appendix A to these Comments that would make these minimum coverage requirements unambiguous and easily verifiable using standard orbital analysis software packages. In particular, Constellation believes that MSS system should be visible at 5° elevation angles, 75% of the time to all parts of the earth between 65° North and South latitudes.

Constellation also proposes a change to the text of § 25.143(b)(2)(iv). The detailed reasons for this change are discussed in Section VII below.

With respect to the questions posed in paragraph 25 of the Notice, Constellation does not believe that any additional technical qualifications are either necessary or desirable. This is particularly the case with respect to the suggestion for minimum capacity requirements which Constellation would oppose. Each system operator will seek to maximize its system capacity based on technological advances and the best operational data as it is obtained. If a licensee designs an

inefficient system, it will fail in the marketplace. Moreover, as shown in Appendix B to these Comments, the channel capacity of a CDMA system is very dependent on the interference sharing environment within which it has to operate. Establishing minimum capacity requirements would necessarily involve the Commission in detailed and controversial engineering judgments on questions relating to choice of modulation parameters, service quality and link margins.

B. Financial Qualifications

In the Notice, the Commission proposes to implement the financial qualifications standards currently specified for the domestic fixed-satellite service at Section 25.140(d) of the Commission's Rules. 47 C.F.R. § 25.140(d). These standards were designed "to provide a clear, objective means by which [the Commission] could determine whether an applicant had sufficient financial resources to allow it to construct and operate its system promptly upon grant."<sup>46</sup> This was adopted for the mature domestic satellite service applicant that required approximately \$200-300 million to construct, launch and operate a system. The MSS proposals presently pending before the Commission have two distinct differences from the domestic fixed-satellite service. First, LEO MSS involves new and unproven technology. This requires the applicant to take significantly more risk than is required for the mature domestic satellite service. Under these

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<sup>46</sup> Licensing Space Stations in the Domestic Fixed-Satellite Service, 50 Fed. Reg. 36071 (Sept. 5, 1985) at para. 5. (1985 Domsat Order).

circumstances, the Commission must be more flexible in its implementation of the financial standards in order to allow different types of systems to evolve. Second, LEO MSS systems can require ten or more times as much capital than is required for domestic satellite systems, much of which is likely to come from foreign investors. It has been estimated that some of the proposed MSS systems will cost in excess of \$4 billion. This is an enormous capital requirement that no company, no matter how large, will bear individually. Therefore, it must be recognized by the Commission that merely requiring applicants to provide evidence of "current assets" will not be dispositive of an ability to finance a proposed system. Additionally, each MSS proponent has a different plan for providing service. Some can begin to provide MSS/RDSS with only a few satellites while others require all satellites to be launched and operational before service can commence. In light of the above, Constellation believes that the applicants should be required to demonstrate the financial capability to construct, launch and operate the minimum number of satellites necessary to commence a commercial service. This will allow each system to evolve in its own unique manner.

Constellation believes that the financial qualifications initially specified for Radiodetermination Satellite Service<sup>47</sup> licensees would be most appropriate in the present situation. In implementing less stringent financial standards for RDSS licensees, the Commission noted that "RDSS is a new, innovative and as yet

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<sup>47</sup> See Radiodetermination Satellite Service, 104 FCC 2d 650, 663 (1986)

unproven service and applicants without substantial internal assets may have difficulty obtaining the large amounts of financing necessary to construct, launch and operate these systems."<sup>48</sup> The exact same situation exists for the current applicants that are seeking authorization in this band.

Nevertheless, Constellation believes that all the applicants will be able to comply with either the domestic satellite or radiodetermination satellite service financial qualifications and is therefore, prepared to support the Commission's proposal on financial qualifications. Constellation does believe that one clarification must be made before the rules are formally adopted. Specifically, the Commission proposed in the Notice "to require applicants to provide evidence of uncommitted (emphasis added) current assets . . . . to meet the estimated costs of constructing all planned satellites." The existing domestic satellite financial qualifications merely require an applicant to demonstrate that it has "current assets." See 47 C.F.R. § 140(d)(i). The requirement to demonstrate "uncommitted current assets" was specifically rejected by the Commission when it adopted the financial qualification standards for the domestic satellite service.<sup>49</sup> The Commission indicated that "the availability of internal funds sufficient to cover the system's investment and first-year operating costs provides adequate assurance at the time the Commission acts on the applications that the system can be built and launched. Current assets – which includes cash, inventory, and accounts receivable – provides a general measure of a

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<sup>48</sup> Id.

<sup>49</sup> 1985 Domsat Order at paras. 12-13.



company's ability to raise funds on the basis of its on-going operations."<sup>50</sup> This same standard must be applied to all the pending applicants. It is highly unlikely that any of the applicants could meet the financial qualifications if they must demonstrate "uncommitted assets".

VII. The Commission Should Adopt Only The Inter-Service Sharing Criteria Mutually Agreed To During The Negotiated Rulemaking

The 1610-1626.5 MHz and 2483.5-2500 MHz bands are allocated to the mobile satellite service on a primary basis, both in the international table of frequency allocations<sup>51</sup> and in the national table of frequency allocations.<sup>52</sup> As a co-primary service with the other services to which these bands are allocated, the Commission's service and licensing rules in Part 25 must provide reasonable technical criteria and coordination arrangements under which the new 1.6/2.4 GHz MSS can operate in a cost effective and practical manner.

Informal Working Group 2 of the NRM Committee analyzed all of the potential sharing situations that could arise in the 1610-1626.5 MHz and 2483.5-2500 MHz bands. These cases included 15 cases of interference from the MSS to other

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<sup>50</sup> Id at para. 13.

<sup>51</sup> See e.g. Final Acts of the 1992 World Administrative Radio Conference.

<sup>52</sup> See Section 2.106 of the Commission's Rules. 47 C.F.R. § 2.106 (1993). See also Report and Order in ET Docket No. 92-28, 9 FCC Rcd 536 (1994) implementing the new MSS L-band allocations at issue in this proceeding.